

What is claimed is:

1. A damper for provision in a hydraulic actuator system between a master cylinder and a slave cylinder of the system, the damper including a housing, including port means for connecting in the system and an imperforate diaphragm carried by the housing beneath the port means and forming a boundary for the system so that the diaphragm may deflect in response to vibrations transmitted through the hydraulic fluid in the system to effect damping of the vibrations, characterized in that:

the housing has a canister configuration and includes a thin imperforate annular sidewall above the diaphragm of substantially uniform thickness and coacting with the diaphragm to define a large volume fluid chamber above the diaphragm providing further system damping by virtue of vibratory volumetric expansion of the annular sidewall.

2. A damper according to claim 1 wherein:

the housing includes an upper part defining the annular sidewall and the port means and a lower part positioned beneath the diaphragm; and

the upper and lower parts coact to clamp a peripheral edge portion of the diaphragm therebetween.

3. A damper according to claim 1 wherein:

the diaphragm comprises a elastomeric diaphragm; and

the damper further includes a stiff diaphragm carried by the housing beneath the elastomeric diaphragm and forming a back up for the elastomeric diaphragm.

4. A damper according to claim 3 wherein:

the housing includes an upper part defining the annular sidewall and the port means and a lower part positioned beneath the stiff diaphragm; and

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the upper and lower parts coact to clamp peripheral edge portions of the elastomeric diaphragm and the stiff diaphragm therebetween.

5. A damper for provision in a hydraulic actuator system between the master cylinder and a slave cylinder of the system, the damper including a housing, including port means for connecting in the system and an elastomeric diaphragm carried by the housing beneath the port means and forming a boundary wall of the system so that the elastomeric diaphragm may deflect in response to low frequency vibrations transmitted through the hydraulic fluid in the system to effect damping of the low frequency vibrations and a further diaphragm positioned beneath and generally parallel to the elastomeric diaphragm to form a gas chamber therebetween and forming a back up for the elastomeric diaphragm so that the elastomeric diaphragm may deform against the further diaphragm in response to high frequency vibrations transmitted through the hydraulic fluid to cause deflection of the further diaphragm to effect damping of the high frequency vibrations, characterized in that:

the housing has a canister configuration and includes a thin imperforate annular sidewall above the elastomeric sidewall of substantially uniform thickness and coacting with the elastomeric diaphragm to define a large volume hydraulic chamber above the elastomeric diaphragm providing further system damping by virtue of vibratory volumetric expansion of the annular sidewall.

6. A damper according to claim 5 wherein the volume of the hydraulic chamber substantially exceeds the volume of the gas chamber.

7. A damper according to claim 5 wherein the annular sidewall forming the hydraulic chamber extends above the elastomeric diaphragm a distance substantially exceeding the height of the gas chamber.

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8. A damper according to claim 2 wherein the annular sidewall is configured above the elastomeric diaphragm to have a domed configuration with the port means substantially at the apex of the dome.

9. A damper according to claim 5 wherein:  
the further diaphragm comprises a spring steel diaphragm;  
the housing is formed of a plastics material; and  
the elastomeric diaphragm comprises a rubber diaphragm.

10. A damper according to claim 5 wherein the housing comprises a two part housing including an upper part defining the annular sidewall and coacting with the elastomeric diaphragm to define the hydraulic chamber and the ports means and a lower part underlining the further diaphragm.

11. A damper according to claim 10 wherein the upper and lower parts define peripheral edge portions which coact to clamp peripheral edge portions of the elastomeric diaphragm and the further diaphragm therebetween.

12. A damper according to claim 11 wherein the peripheral edge portions of the upper and lower parts are held together in clamped relation by an annular clamp band surrounding the peripheral edge portions of the upper and lower parts.

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